A REDESIGN OF THE NAVY ENLISTED PERSONNEL DISTRIBUTION PROCESS

NAVAL POSTGRADUATE SCHOOL

GRADUATE SCHOOL OF BUSINESS AND POLICY

PROFESSOR WILLIAM GATES

PROFESSOR MARK E. NISSEN

MAJOR GERARD KOH

Distribution

Putting the 'Faces' into the 'Spaces'

Shortcomings of Current Process

- Manual process
- Not fully meeting commands' requirements or sailors' needs
- Labor and process inefficiencies
- Inherent human error and variability
- Perception that the process is subjective and unfair

Research Goals

- Propose an **_Innovative Redesign_** that
  - improves quality of sailor to billet matches
  - improves efficiency of distribution process
  - integrates process design and DSS technology
- Integrate previous studies into a practical and streamlined process and DSS

Enabling Technologies

- **Algorithms**
  - 2-sided matching
  - Optimization
- **Information Technology**
  - Intelligent Software Agents
  - Expert Knowledge based systems
  - Navy Marine Corps Intranet
  - Existing legacy systems (JASS, EDPROJ, EPRES)
- **Technology - Tried and Tested**

Critical Success Factors

- Smooth, timely, complete and accurate information flows.
- Sailors expectations and needs are managed and met.
- High quality of matches
- Trust in the objectivity and reliability of the system
- Stability of matches
- High proportion of automatically matched sailors and billets
- Flexibility to deal with exceptions and dynamic changes
- Maintain the human touch

Constraints

- Structural
  - Priority Billets
  - Tied Movers
  - Exceptional Family Member Program
  - Relatively fixed PRDs
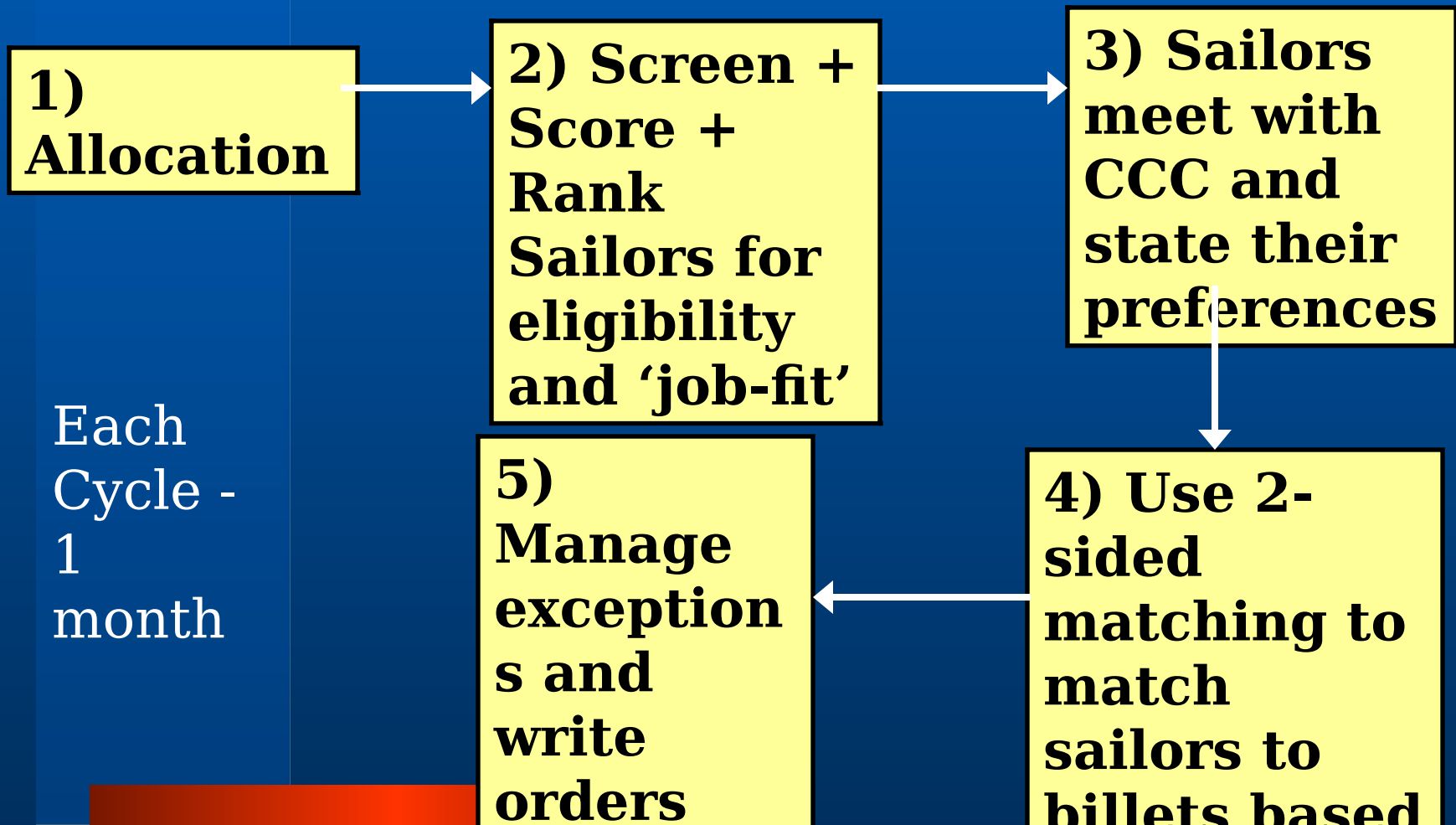 - All Sailors Must be Matched to a Billet

Constraints

- Human
  - Need for Human Interaction
  - Perceptions of Equity
- Power
  - Veto and Auditing powers
- Culture
  - Culture of 'Duty before Self'

Redesign Methodology

- Baseline approach
- Targets key processes and support systems whilst keeping many current structures in place
- Benefit: Faster, easier and less costly to implement

Redesigned 5 Step Distribution Process Cycle

Each Cycle - 1 month

1) Allocation

2) Screen + Score + Rank Sailors for eligibility and 'job-fit'

3) Sailors meet with CCC and state their preferences

5) Manage exceptions and write orders

4) Use 2-sided matching to match sailors to billets based

New DSS - NERISSA

- NERISSA - Navy Enlisted Resource Integrated System for Smart Assignments
- Integrated DSS that supports entire Distribution process
- Features:
  - Shared databases
  - Rides on NMCI
  - Multiple modules
  - Seamless processing

BENEFITS

- **Meets Critical Success Factors**
  - Smooth, timely, complete and accurate information flows.
  - Sailors expectations and needs are managed and met.
  - High quality of matches
  - Trust in the objectivity and reliability of the system
  - Stability of matches
  - High proportion of automatically matched sailors and billets
  - Flexibility to deal with exceptions and dynamic changes
  - Maintain the human touch

Shortcomings

- Not All Matches are Stable
- Gapped P2 &3 and Non-priority Billets
- Manual Matching
- Gaming

CONCLUSIONS

- **Process is Robust**
- **Project serves as platform for more detailed studies :**
  - empirical research into the variables and verifying the potential performance of the process,
  - examining Navy personnel policies
  - further research required to produce prototypes of NERISSA

QUESTIONS

1) Allocation

- Largely unchanged from current process
- Project distributable inventory and billet vacancies 9 mths out
- Produce Navy Manning Plan (NMP)
- DSS used : Enlisted Distribution projection System (EDPROJ)

Placement

- **Placement Officers Represent Commands needs**
- **Input Billets 'Must Have' and weighted 'Should Have' sailor attributes into DSS for scoring**
- **DSS :Placement Sub-System (PlaceS)**

Scoring Table

Attribute/Score	Rq'mt	Weight	Meet needs	+1 increment	+2 increment	-1 increment	-2 increment	Remarks
Commands' Requirements								
Pay Grade	E5	5	10	8	Screen out	8	Screen out	Screen out sailors who +/- required paygrade by 2 steps
Previous experience	2 yrs	2	10	12	13	8	5	
Promotability	Promote	3	10	12	13	8	5	
PRD	06/02	4	10	11	11	8	5	
etc…								
Navy Policy Requirements								
Minimum PCS	Pacific	4	10	NA	NA	8	5	Increment= # of changes in time zones
Sea –Shore Cycle	Sea	5	10	0	0	0	0	Score = 0 if sailor's next rotation is a shore duty
etc.								
Bonus Scores								
EFMP		5	10	0	0	0	0	Score = 0 if sailor does not have the attribute
Incentive Bonus Score		5	10	0	0	0	0	

2) Screen + Score + Rank Sailors

PROCESS

Screen Sailors on 'Must Have Attributes'

NERISSA MODULE

SaBiSS

= Sailor and Billet Scoring System

'Must Have' Attributes

- Correct Rating and NEC (e.g. a Corpsman cannot be considered for a Nuclear Technician's job).
- Projected Rotation Date must fall within the window where the command requires them.
- Correct Gender
- More...See Cdr Hatch and Valerie and Virginia's thesis

2) Screen + Score + Rank Sailors (con't)

PROCESS

Screen Sailors on 'Must Have' Attributes

Score Eligible Sailors on 'Should Have' Attributes

NERISSA MODULE

SaBiSS

= Sailor and Billet Scoring System

'Should Have' Attributes

- Rank or pay grade.
- Location that is not too far from the billet location to minimize PCS cost.
- Previous experience required on the same type of ship or department.
- Correct sea to shore rotation cycle.
- PRD. Sailor can PRD to new billet at the 'right time' where billet gapped time is minimized.
- Exceptional Family Member Program EFMP.
- Incentive attribute for bonus score for volunteering for priority billets

2) Screen + Score + Rank Sailors (con't)

PROCESS

Screen Sailors on 'Must Have' Attributes

→

Score Eligible Sailors on 'Should Have' Attributes

→

Rank Sailors based on Total Sailors' Scores

NERISSA MODULE

SaBiSS

= Sailor and Billet Scoring System

Sailors Total Score

Total Sailor Score,

$$S_T = \left(\sum (S_i{}^c * W_i{}^c) / \sum (10 * W_i{}^c) \right) * 50 + \left(\sum (S_j{}^p * W_j{}^p) / \sum (10 * W_j{}^p) \right) * 50 + S_i{}^B$$

- $S_i{}^c$ is the sailor's score for command needs attribute i
- $W_i{}^c$ is the weight given to command needs attribute i
- $S_j{}^p$ is the sailor's score for policy needs attribute j
- $W_i{}^p$ is the weight given to policy needs attribute j
- $S_i{}^B$ is the sailor's bonus scores

Screening & Scoring Tied Movers and EFMPs

- **Tied movers - Navy Enlisted Couples who have to be assigned to the same location**

- **EFMP - Exceptional Family Member Program**

- **Screen out locations that either party is ineligible for / do not support EFMP**
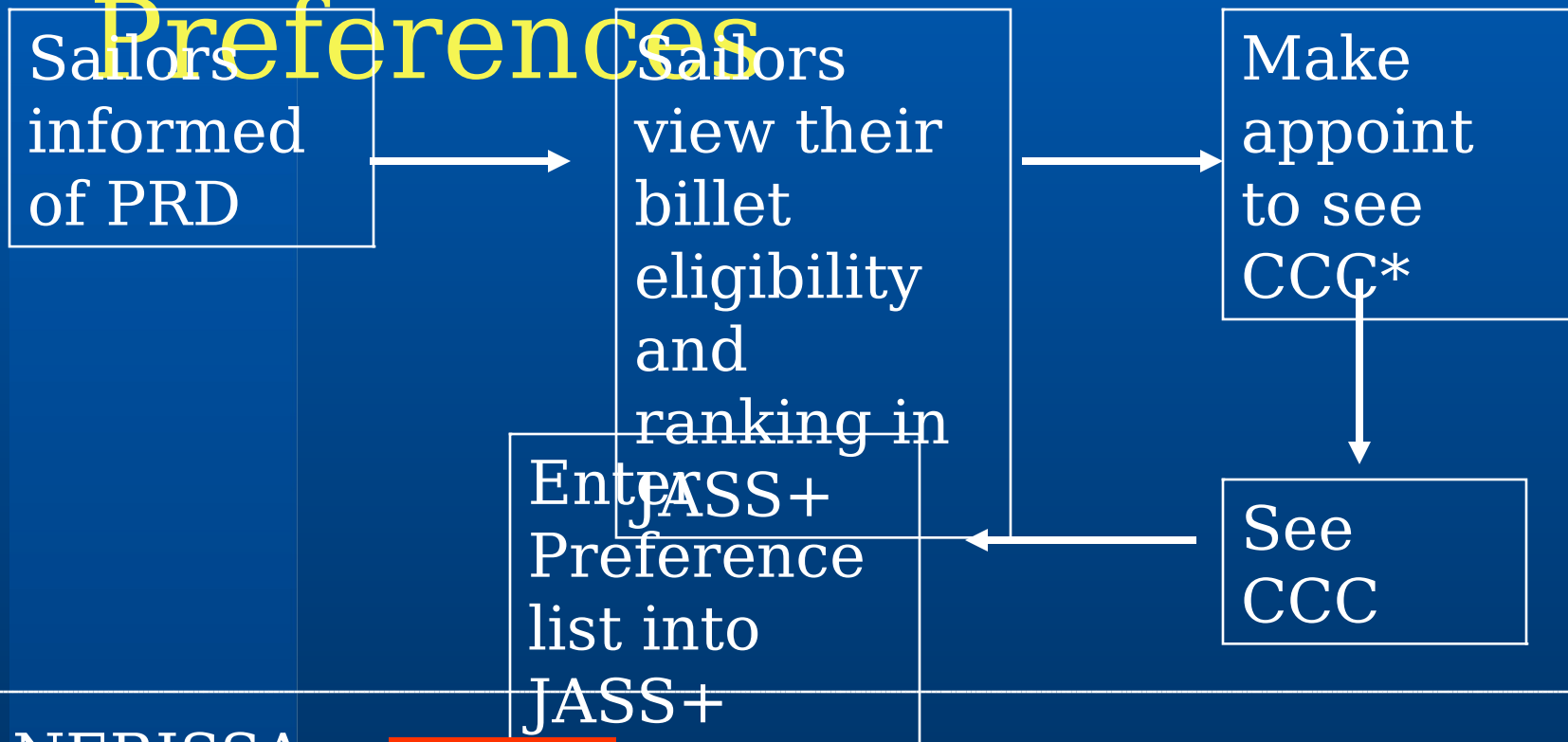
What if Sailor Needs Training?

- **What if Sailor Needs qualification Training before assuming next assignment?**
- **SaBiSS will identify sailors for qualification training.**

Transfer Rankings to other Modules

- **Billets' ranking of sailor will be transferred to JASS+, and SaBMaM**

3) Career Counseling and Sailors List Their Preferences

```
Sailors          Sailors          Make
informed         view their       appoint
of PRD           billet           to see
                 eligibility      CCC*
                 and
                 ranking in
                 JASS+
                                        See
         Enter                          CCC
         Preference
         list into
         JASS+
```

NERISSA MODULE

JASS+ = Job Advertising and Selection System +

*CCC = Command Career Counselor

Role of CCCs

- **CCCs provide the 'human touch', reinforces the Navy's paternalistic image, and act as sailors single point of contact**

- **Provide accurate, up to date information to counsel sailors**

- **Deal with sailors needs and requests**

- **Use Career Knowledge Based System (CKBS) to produce individualized career advisories**

Career Management Advisory

- **Recommends course of action for sailors and detailing relevant info**
- **Produced by 'smart' technology in CKBS**
- **Takes into account:**
  - Sailor attributes and preferences
  - career path needs,
  - training possibilities,
  - billet requirements,
  - sailor preferences and
  - manning policies.

CKBS Features

- **Expert Knowledge based system**
- **Scoring + ranking Billets based on Sailors' preferences**
- **Produce career mgmt advisories**
- **Online personnel policy library**
- **Search features**

JASS+

- **Souped up version of current JASS**
- **Sailors' main tool**
- **Features**
  - **Sailor View only screen**
  - **Job description**
  - **Appointment Scheduling with CCC**
  - **Billet application**
  - **Progress Tracking**

JASS - Job Advertising and Selection System

Sailor Preference List

- **Must include P1 billets**
- **Increase chances of P1 billets being filled**
- **Incentives given to encourage sailors to choose more P1 billets**
  - **Monetary $$**
  - **Priority treatment for next assignment**

Step 4 : Two-Sided Matching of Sailors to Billets

- The Sailor-Billet Matching Module (SaBMaM) uses data from:
  - Sailor preferences from JASS+
  - Command preferences from SaBiSS
- Match using Two-sided Matching Algorithm
- Command Bias

Matching Process

First iteration - Use two-sided matching algorithm to match

Remove matched tied movers who are assigned to billets in the same location from list

Force match the rest of the tied-movers to billets in the same location, based on the highest average score for the pair of billets.

Con't Next Pg

NERISSA MODULE

SaBMaM = Sailor and Billet Matching Module

Second iteration

use two- sided matching algorithm to match remaining sailors and billets.

Unmatched P2&3 billets

Recycle to next distribution cycle till matched

Unmatched P1 billets and sailors

Recycle for 3 distribution cycles - then manage as exceptions
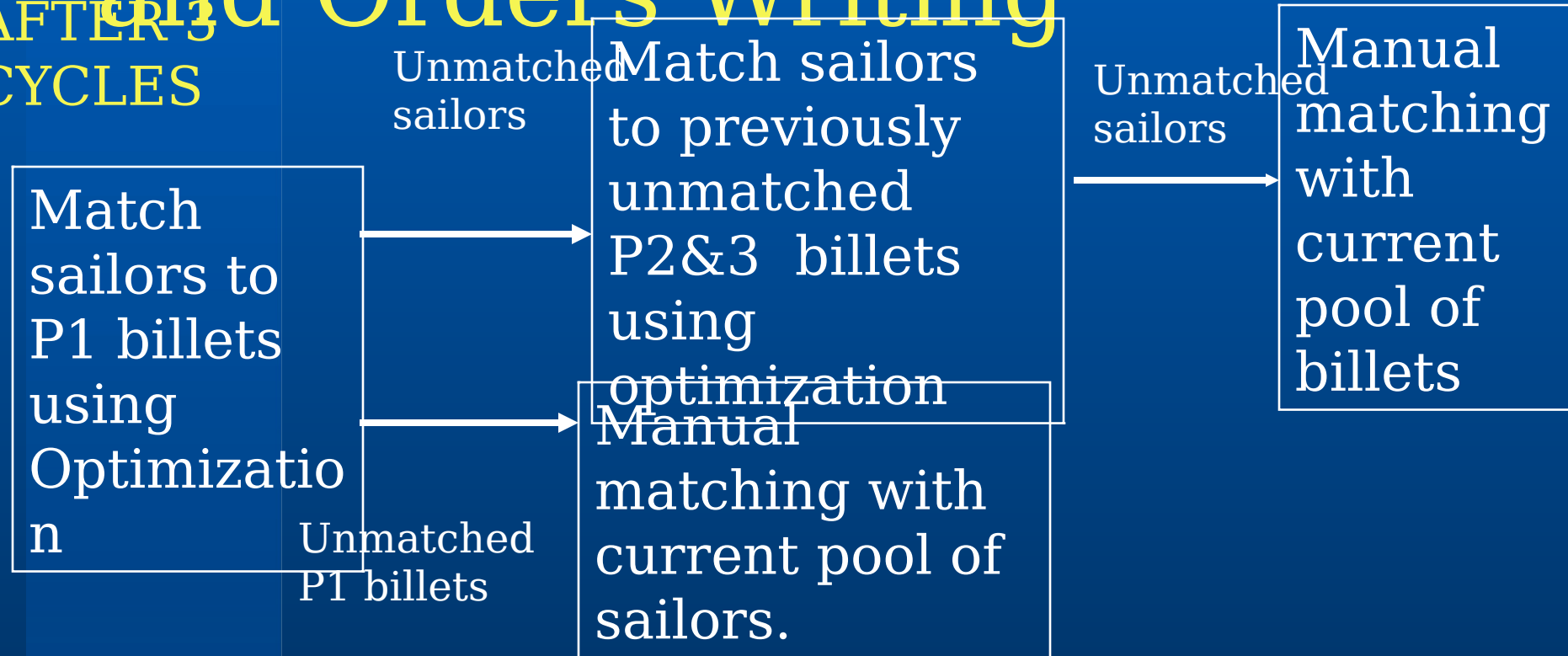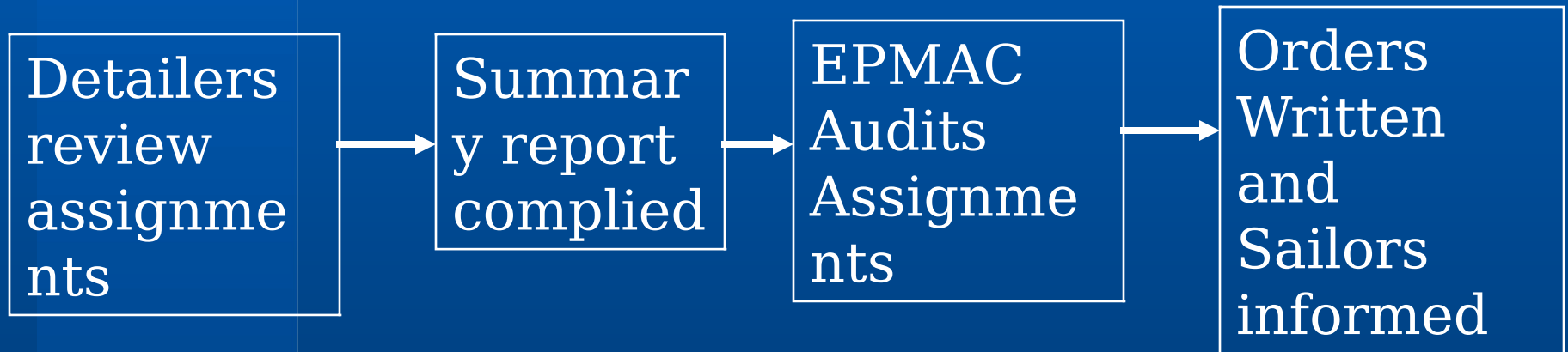
Go to Main

Matching Cycles

- **Matching cycles increased to 1 mth (from 2 wks). Increases % and quality of matches as pool increases**

- **Three month-long cycles to be automatically matched**

5) Exception Management, Auditing, and Orders Writing

AFTER 3 CYCLES

Match sailors to P1 billets using Optimization

Unmatched sailors →

Unmatched P1 billets →

Match sailors to previously unmatched P2&3 billets using optimization

Manual matching with current pool of sailors.

Unmatched sailors →

Manual matching with current pool of billets

Detailers review assignments	→	Summary report complied	→	EPMAC Audits Assignments	→	Orders Written and Sailors informed

NERISSA MODULE

ACOM = Assignment Control Module

Handling Other Exceptions

- Sailors who do not state their preferences

- 'Sailor Priority' Programs
  - GUARDS III
  - TWILIGHT
  - SWAPS

- Identifying Deploying Units' Requisitions 18 months Out